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L 46952-66 EMT(1)/EMF(m)/EEC(k)-2/T/EMF(t)/ETI IJF(c) JD/JG ACC NR. AP6031029 SOURCE CODE: UR/0109/66/011/009/1645/1650

AUTHOR: Kogan, L. M.; Meskin, S. S.; Nasledov, D. N.; Trushina, V. Ye.; Tsarenkov, B.V.

ORG: Physico-Technical Institute im. A. F. Ioffe, AN SSSR (Fiziko-tekhnicheskiy institut AN SSSR)

TITLE: Electron-photon GaAs transistor

SOURCE: Radiotekhnika i elektronika, v. 11, no. 9, 1966, 1645-1650

TOPIC TAGS: transistor, electron photon transistor, gallium arsenide transistor, CALLIUM ARSENIOE, CICTRON, PHOTON
ABSTRACT: The results of an experimental investigation of GaAs electron-photon transistors (R. Rediker et al., Proc. IEEE, 1763, 51, 1, 218) at 77 and 293K are reported. The transistors were made from Te doped n-GaAs. Source meterial parameters: electron concentration, 7 x 10¹⁷ -- 5 x 10¹ per cm³; mobility, 1800--3200 cm²/v sec; dislocation density, 10000 per cm²; p-n-p structure was produced by Zn diffusion; plate thickness, 300 µ; base thickness, 100-200 µ; p-region thickness, 50--100 µ. Collector current vs. collector voltage characteristics (for 0--100 amp/cm² emitter current) and collector current vs. emitter current characteristics are shown. The emitter-collector current transfer ratio was found to increase from 0.05 to 0.075 with the collector voltage increasing from 0 to 8 v, at 77K. At room temperature, the transfer ratio amounts to 1/20-th of the liquid-nitrogen ratio. When the emitter

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current increases from 0.1 to 0.5 amp, the power gain decreases from 12 to 4 and the voltage gain, from 350 to 80 (at 77K). The estimated total quantum yield of photons is 0.1 at 77K. Desirability is noted and ways are indicated for making the electron-photon transistor a practical amplifier. Orig. art. has: 4 figures and 1 formula.	
SUB CODE: 09 / SUBM DATE: 29Mar65 / ORIG REF: 003 / OTH REF: 006 / ATD PRESS: 5089	
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CIA-RDP86-00513R001756920004-7

AT/JD EWT(1)/EWT(m)/EWP(t)/ETI IJP(c)L 04741-67 SOURCE CODE: UR/0181/66/008/007/2098/2103 ACC NR: AP6024472 AUTHOR: Imenkov, A. N.; Kozlov, M. M.; Nasledov, D. N.; Tsarenkov, B. V. ORG: Physicotechnical Institute im. A. F. Ioffee, AN SSSR, Leningrad (Fizikotekhnicheskiy institut AN SSSRJ TITLE: Kinetics of radiative recombination of nonequilibrium carriers in GaAs p-n junctions SOURCE: Fizika tverdogo tela, v. 8, no. 7, 1966, 2098-2103 TOPIC TAGS: gallium arsenide, radiative recombination, semiconductor carrier, pn junction, relaxation process, spectral distribution, radiation intensity ABSTRACT: The authors report results of experiments on the dependence, on the current density, of the intensity of radiation for different bands of the spectrum (photon energy range 0.7 - 1.5 ev) of GaAs diffusion p-n junctions, at 77 and 293K, and also results of a simultaneous investigation of the relaxation of the radiation intensity when rectangular current pulses are passed through the junction. The relaxation study is a continuation of earlier work by the authors (Abstracts of Papers of Second All-Union Conference on p-n Junctions, AN LatSSR, Riga, 1964, p. 14) where a long-wave aftereffect was noted after the termination of a square pulse. The GaAs p-n junctions were obtained by diffusion of Zn, Cd, or Cd and Mn jointly. The tests consisted of determining the spectral distribution of the radiation intensity, the variation of the radiation intensity with the current, and oscillograms of the current, voltage, and Card 1/2

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radiation-intensity pulses. The current pulses ranged in amplitude from 0.05 to 7 amp and in duration from 10 to 100 µsec. Pulses with duration ~10 nsec were also used. The spectrum consisted of several bands, the presence of which indicates that the recombination of the nonequilibrium carriers goes in part through deep levels. The possible kinetics of such a process are discussed. The current and voltage relaxation time is several orders of magnitude shorter than the intensity relaxation time of the long-wave radiation. The bands with longer wavelength have longer relaxation times. The two ban-s with the longest wavelength are attributed to recombination of the minority carriers injected over the potential barrier and captured at deep levels. The authors thank 0. V. Konstantinov, V. I. Perel', and A. L. Efros for a discussion of the results. Orig. art. has: 4 figures.

SUB CODE: 20/ SUBM DATE: 11Dec65/ ORIG REF: 002/ OTH REF: 002

AT/JD/JS IJi'(c)ENT(1)/E T(m)/T/四尺(t)/ETI SOURCE CODE: UR/0181/66/008/008/2462/2465 ACC NR: AP6026705 AUTHOR: Danilova, T. N.; Kogan, L. M.; Meskin, S. S.; Nasledov, D. N.; Tsarenkov, B.V ORG: Physics-Engineering Institute im. A. F. Ioffe, AN SSSR, Leningrad (Fizikotekhnicheskiy institut AN SSSR) 27 17 TITLE: Comparative investigation of the recombination radiation of GaAs p-n junctions with and without a Fabry-Perot resonator SOURCE: Fizika tverdogo tela, v. 8, no. 8, 1966, 2462-2465 TOPIC TAGS: Fabry Point resonator, recombination radiation, arsenide, ducte ABSTRACT: The published literature contains information on the investigation of spontaneous, stimulated, and coherent radiation of GaAs p-n junctions pertaining to the characteristic radiation parameters as a function of the current for diodes with or without resonators. The purpose of the present article is to compare the dependences of the maximum energy hom and the half-width & of the fundamental radiation band on the current density through a single p-n junction with and without a Fabry-Perot resonator. The authors studied diodes in which the p-n junctions were obtained by diffusion of zinc in Te-alloyed n-GaAs with electron concentration 7·10¹⁷--3·10¹⁸cm⁻³; the area of the p-n junction $=10^{-3}$ cm. The current through the diode and the spectral distribution of radiation intensity were measured. It was found that hun, starting **Card** 1/2

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from the lowest current densities (25 a/cm²), increases with increasing current and then becomes practically independent of the current. The dependence of 6 on current density is given for small current densities (5--70 a/cm²). It is concluded from the results presented that the primary narrowing of the spectrum occurs as a result of population inversion at the rarefied states which are responsible for the secondary narrowing of the spectrum, i.e., beyond the conventional stimulated and coherent radiation with maximum energy ~1.47 ev. The "tails" in the forbidden zone are probably the rarefied states responsible for the primary narrowing of the spectrum. The authors thank 0. V. Konstantinov, V. I. Perel', and A. L. Efros for discussing the results of this work. Orig. art. has: 2 figures.

SUB CODE: 20/ SUBM DATE: 26Jan66/ ORIG REF: 001/ OTH REF: 001/ ATD PRESS: 5064

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TIC/JD/JC EWT(1)/EWT(m)/EEC(k)-2/T/EWP(k)/EWP(t)/ET1IJP(c) SOURCE CODE: UR/0181/66/008/009/2789/279 ACC NR. AP6030977 AUTHOR: Kogan, L. M.; Libov, L. D.; Nasledov, D. N.; Nikitina, T. F.; Strakhovskiy, G. M.; Tsarenkov, B. V. ORG: Physicotechnical Institute im. A. F. Ioffe, AN SSSR, Leningrad (Fizikotekhnicheskiy institut AN SSSR); Physics Institute im. P. N. Lebedev AN SSSR, Moscow (Fizicheskiy institut AN SSSR) TITLE: Certain properties of GaAs laser diodes with an epitaxial p-n junction at room temperature SOURCE: Fizika tverdogo tela, v. 8, no. 9, 1966, 2789-2791 TOPIC TAGS: solid state laser, semiconductor laser, gallium arsenide, laser, epitaxial diode, infrared laser, PN JUNCTION, EPITAXIAL GROWING ABSTRACT: In an experimental investigation of epitaxial p-n GaAs junctions, telluriumdoped n-type and zinc-doped p-type GaAs was used. The electron concentration in the n-type GaAs was 5.5 x 10^{17} -2.4 x 10^{18} cm⁻³; the hole concentration in the p-type GaAs was $1.5 \times 10^{18} - 2.4 \times 10^{19}$ cm⁻³. The specimens were criented along the (100) plane and the epitaxial p-n junction was prepared from the liquid phase by a method described elsewhere (H. Nelson, RCA Rev., 24, 603, 1963). The dislocation density near the p-n junction in the epitaxial layers did not exceed that in the wafer and was 104 cm-2. The Fabry-Perot cavity was formed by the cleaved (110) surfaces, and the electrical

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contacts were made of indium. The residual resistance of a diode with an area of 10⁻³ cm² was less than 0.1 ohm. Laser action at room temperature was achieved with 10⁻³ cm² was less than 0.1 ohm. Laser action at room temperature was achieved with 30-nanosec current pulses. An FEU-22 photomultiplier recorded the optical output. The threshold currents were determined from the dependence of intensity on current. The p-type GaAs specimens with hole concentrations of 2.4 x 10¹⁹ cm² and a mobility of 50 cm²/v·sec lased at 9000Å at threshold currents of 1.5 x 10⁵ amp/cm². Investigations were also made dispecimens in which the epitaxial layer, doped with zinc and partly compensated by lead, was grown on a tellurium-doped GaAs substrate with an partly compensated by lead, was grown on a tellurium-doped GaAs substrate with an action of 9.5 x 10¹⁷ cm² and a mobility of 2400 cm²/v·sec. These electron concentration of 9.5 x 10¹⁷ cm² and a mobility of 2400 cm²/v·sec and at 8910 Å lased at room temperature at 9010 Å at currents of 3.8 x 10⁵ amp/cm² and at 8910 Å lased at room temperature at 9010 Å at currents of 3.8 x 10⁵ amp/cm² and at 8910 Å lased at room temperature and 18-nanosec pulses; that of n-GaAs lasers was 30 watts with 700-amp currents and 18-nanosec pulses; that of n-GaAs lasers was 30 watts with 300-amp currents and 30-nanosec pulses. Orig. art. has: 1 figure. [YK] SUB CODE: 20/ SUBM DATE: 25Mar66/ ORIG REF: 001/ OTH REF: 003/ ATD PRESS: 5078

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ACC NRI AP6036972 (A,N) SOURCE CODE: UR/0181/66/008/011/3282/3287

AUTHOR: Gladkiy, B. I.; Nasledov, D. N.; Tsarenkov, B. V.

ORG: Physicotechnical Institute im. A. F. Ioffe, AN USSR, Leningrad (Fiziko-tekhnicheskiy institut AN SSSR)

TITLE: Variation of the current-voltage characteristic of a GaAs laser during transition from the amplification to the generation mode

SOURCE: Fizika tverdogo tela, v. 8, no. 11, 1966, 3282-3287

TOPIC TACS: laser, semiconductor laser, volt ampere characteristic

ABSTRACT: The characteristic of the gallium arsenide diode was investigated with the aid of a Fabry-Perot resonator at currents corresponding to the transitions from the amplification to the generation mode. The p-n structure of the diodes used in the experiment was based on n-gallium arsenide alloyed with tellurium (electron concentration $2 \times 10^{18} \text{ cm}^{-3}$); the p-region was alloyed with zinc. The p-n crystal was 170 to 200 µm thick, the p-region was 50 to 60 µm thick, and the p-n transition area was approximately 10^{-3} cm^2 . The following characteristics were measured: current-voltage; spectral distribution of radiation intensity at different currents; and differential capacitance versus voltage. The experimental results show that at and differential capacitance versus voltage. The experimental results show that at diode voltages of $U \ge \frac{EK}{2}$ (Eg is the width of the rorbidden band of gallium arsenide, diode voltages of the LU characteristic has two linear sections, with a sharp

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heracterized by inherence in	the transition r is the increase o otoeffect, which i	egion. The most product of charge carriers in	lected. Each section is Rres, and the bend of pable cause for the decrete layer as the resultenitted owing to the ent through the p-n tr	t
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SOURCE CODE: UR/0120/66/000/004/0189/0193

ACC NR. AP6030155

AUTHOR: Gol'dberg, Yu. A.; Nasledov, D. N.; Tsarenkov, B. V.

ORG: Physico-Technical Institute, AN SSSR, Leningrad (Fiziko-tekhnicheskiy institut

AN SSSR)

TITLE: The ohmic contact between gallium arsenide and indium

SOURCE: Pribory i tekhnika eksperimenta, no. 4, 1966, 189-193

TOPIC TAGS: gallium arsenide, indium, semiconductor research

ABSTRACT: The wetting of gallium arsenide surface with indium, and the extent of fusion and contact resistance as a function of temperature and fusion time were studied. It is shown that 100% wetting and minimum contact resistance occur at a temperature of 500°C and above. The GaAs-In junction was obtained by fusion in hydrogen. Hydrogen was used as the reducing medium to prevent the oxidation of In and GaAs at high temperacures. To prevent the explosion of the hydrogen-air mixture, a neutral gas was passed through the system before and after the hydrogen was turned on. The gases were dried by cooling them to a temperature of -196°C. Activated charcoal was used to purify H2 and He at liquid nitrogen temperature. The following parameters were determined during the fusion process: the edge wetting angle, contact resistance, wetting coefficient, depth of fusion, and hole shape. The reduced resistance of the n-GaAs-In

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ACC NRI AP6032018	BOUNCE CODE: UN/0306/66/001/006/0208/0210
M. Strokhovskiv. G. M.: Sungurove	.; Nasledov, D. N.; Nikitina, T. F; Orayevskiy, I.
ORG: Physics Institute im. P. N. stitut Akademii nauk SSSR)	Lebedev, Academy of Sciences BSSR (Fizicheskiy in-
TITLE: Continuous coherent radiat	ion of epitaxial diodes of GaAs at 77K
SOURCE: Zhurnal eksperimental'noy	/ i teoreticheskoy fiziki. Pis'ma'v redaktsiyu.
TOPIC TAGS: gallium arsenide, epigsion spectrum, recombination	Itaxial growing, pn junction, semiconductor laser, emission
ABSTRACT: The authors-report conwith epitaxial pn junction operat duced by liquid epitaxy by the me epitaxial layer was doped with te	tinuous generation from a GaAs semiconductor laser ing with the medium at 77K. The junction was prothod of H. Nelson (RCA Rev. v. 24, 603, 1963). The llurium to a density 5 x 10 ¹⁸ cm ⁻³ . A Fabry-Perot slong the (110) plane. Emission values of
the spectra of the same diode, ob in pulsed or continuous operation trum shifts toward shoreter wavel	tained at different values of the exciting current, , show that the maximum of the recombination specengths with increasing current; this shift is due to ilevels with increasing pump energy, and also to the the spectrum in the continuous mode, relative to
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ACC NR: AP7001959 SOURCE CODE: UR/0120/66/000/006/0180/0184

AUTHOR: Gol'dberg, Yu. A.; Nasledov, D. N.; Tsarenkov, B. V.

ORG: Physicotechnical Institute, Academy of Sciences SSSR, Leningrad (Fiziko-

tekhnicheskiy institut AN SSSR)

TITLE: Thin multilayer gallium arsenide-metal contacts

SOURCE: Pribory i tekhnika eksperimenta, no. 6, 1966, 180-184

TOPIC TAGS: ohmic contact, multilayered ohmic contact, gallium arsenide, gold, tin,

nickel, zinc, silver, copper

ABSTRACT:

A method of manufacturing gallium arsenide-metal contacts by chemical deposition of thin metal layers has been developed. The method permits uniform coating of gallium arsenide with thin (about 1 μ) layers of various metals with a very small (1 μ) depth of fusion. The main advantage of the small depth of fusion is that the crystals can be cleaved together with the deposited metals. It was found that with only one metal, the contact was either nonohmic, not sufficiently low-ohmic, or technologically unsuitable. The best low-ohmic contacts were obtained with several layers of various metals deposited on gallium arsenide. For instance a contact

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BELLE, M.L.; VALOV, Yu.A.; GORYUNOVA, A.N.; ZLATKIN, L.B.; IMENKOV, A.N.; KOZLOV, M.M.; TSARENKOY, B.V.

Optical and photoelectric properties of ZnSiP₂ single crystals.

Dokl. AN SSSR 163 no.3:606-603 Jl '65. (MIRA 18:7)

1. Fiziko-tekhnicheskiy institut im. A.F.Ioffe AN SSSR. Submitted January 29, 1965.

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ACCESSION NR: AP5021323

UR/0120/65/000/004/0014/0022 621.382.032.27

AUTHOR: Libov, L. D.; Meskin, S. S.; Nasledov, D. N.; Sedov, V. Ye; Tsarenkov, B. V. 755

TITLE: Gallium arsenide-metal ohmic contacts

SOURCE: Pribory i tekhnika eksperimenta, no. 4, 1965, 14-22

TOPIC TAGS: gallium arsenide, semiconductor alloy, indium base alloy, indium

ABSTRACT: The article reviews the literature data on the properties of certain impurities in gallium arsenide and the materials and methods used by various authors for preparing olmic contacts on n- and p-type GaAs. Such contacts are made by fusing in indium, tin, and lead, alloys of indium and gold, and also alloys of silver with zinc and silver with lead. Indium is preferred for ohmic contacts on n-type GaAs with an electron concentration between 1.5 x 1017 and 1 x 10^{19} cm-3 and on p-type GaAs with a hole concentration \geq 2 x 10^{18} cm-3; an alloy of indium with a small amount of zinc (about 1%) is preferred for contacts on p-type GaAs with a hole concentration \leq 2 x 10^{18} cm-3 if the contacts are intended for operation at temperatures not above 150C. The advantages of indium $\frac{1}{12}$ alloy with a small amount of Zn are: (1) they form low-resistance ohmic

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contacts on GaAs at relatively low melting points; (2) they are the softest contact materials and hence do not cause mechanical strains in GaAs near the contact; (3) they do not undergo any structural transformations (in contrast to Sn) over a range extending from the melting point to the temperature of liquid helium. Orig. art. has: 1 figure and 3 tables.

ASSOCIATION: Fiziko-tekhnicheskiy institut AN SSSR, Leningrad (Physicotechnical

Institute, AN SSSR)

SUBMITTED: 22Jan65

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IMENKOV, A.N.; KOZLOV, M.M.; MESKIN, S.S.; NASLEDOV, D.N.; RAVICH, V.N.; TSARENKOV, B.V.

Electroluminescence spectra of strongly degenerate gallium arsenide. Fiz. tver. tela 7 no.3:775-780 Mr *65. (MIRA 18:4)

1. Fiziko-tekhnicheskiy institut imeni Toffe AN SSSR, Leningrad.

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MURLULOV. Vo. .. which, J.J.; NACHMENT, N.D.; TRANSMENT, M.T.

Study of the p-n junctions of gallium argenide with differential experiance dependent on the potential. Padiotekh. i elektron.

(MIRA 18:3)

10 no.3:468-475 Mr 165.

1. Piziko-tekhnicheskiy institut im. A.F. Toffe AN SCOR.

IVANOVA, Ye.A.; NASLEDOV, D.N.; TSARENKOV, B V.

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Electric properties of diffusion p-n junctions in gallium arsenide. Direct branch of the voltage-current characteristic. Radiotekh. i elektron. 10 no.4:703-714 Ap 165.

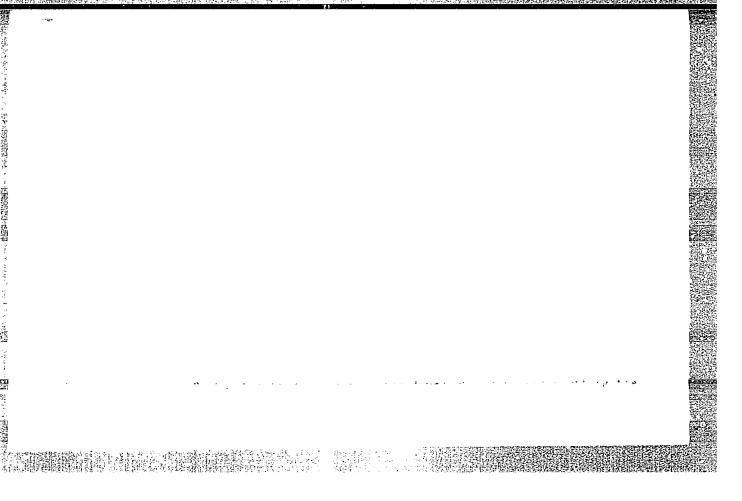
Electric properties of diffusion p-n junctions in gallium arsenide.

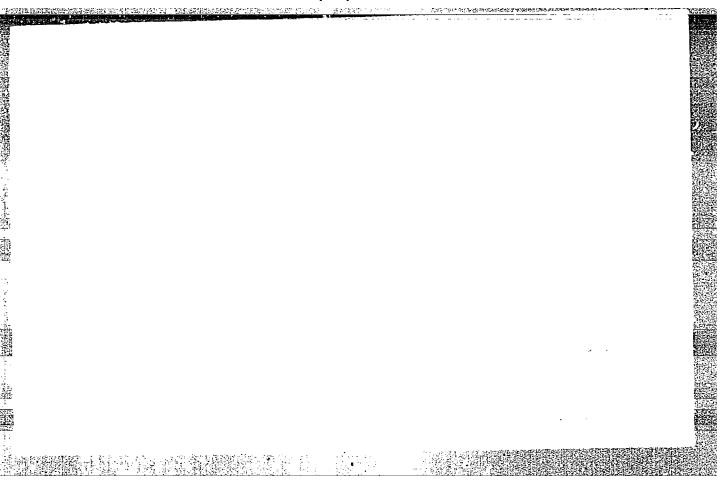
Reverse branch of the voltage-current characteristic. Ibid.:715-719

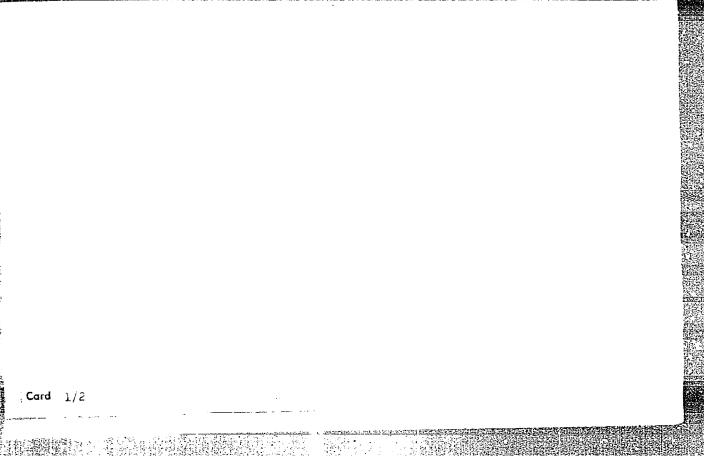
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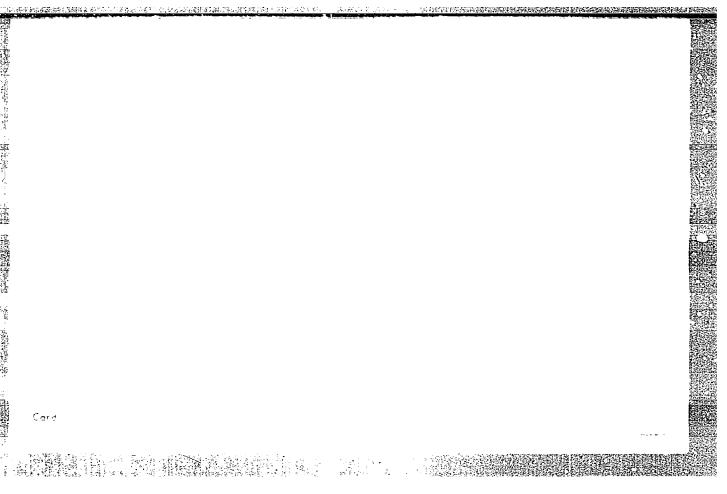
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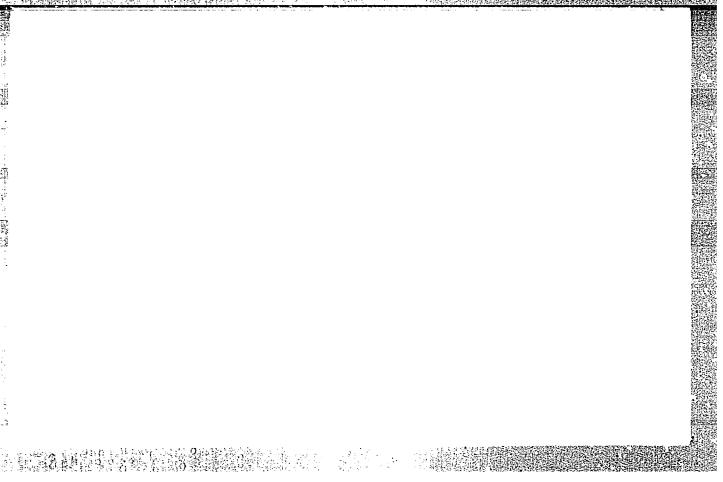
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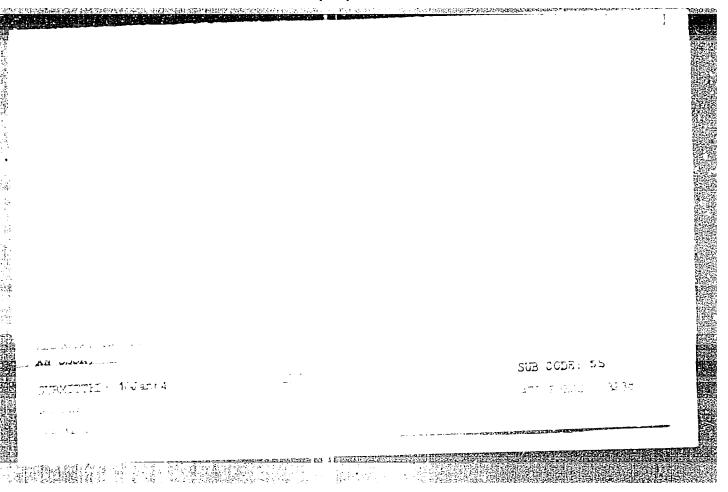












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TEFIMOV, A.D., inshener; PAVLOV, V.I., inshener; CHURENKOV, A.V., tekhnik; SERGEICH, V.I., tekhnik; TSAZENKOVA, B.S., motoristka.

Autoclave porous-concrete building products from waste cinder. (MLRA 7:3)
Rats.i izobr.predl.v stroi. no.55:18-19 '53. (Cinder blooks)

Tsares, P. G. "Saki mud treatment of patients suffering of shronic esteenyelitis of the thigh and the knee due to old runshet wounds", Stornik nauch, trudew kurerta Saki, Vol. IV, 1948, p. 97-106.

So: U-3261, 10 April 1953 (Letopis 'Zhurnal 'nykh Statey, NO. 12, 1949).

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TSAREV, A.A., elektromekhanik

Change the design of the dividing junction boxes. Avtom. telem. i sviaz' 3 no.8:28 Ag '59. (MIRA 13:2)

1. Minskaya distantsiya signalizatsii i svyazi Belorusskoy dorogi.
(Railroads---Electric equipment)

GRODZEISKAYA, I.IA., inzh.; TSAHEV, A.I., inzh.

In situ investigation of the work of the anchored upstream floor of the Volga Hydroelectric Power Station. Trudy Gidroproekta 2: 168-176 '59. (MIRA 13:7)

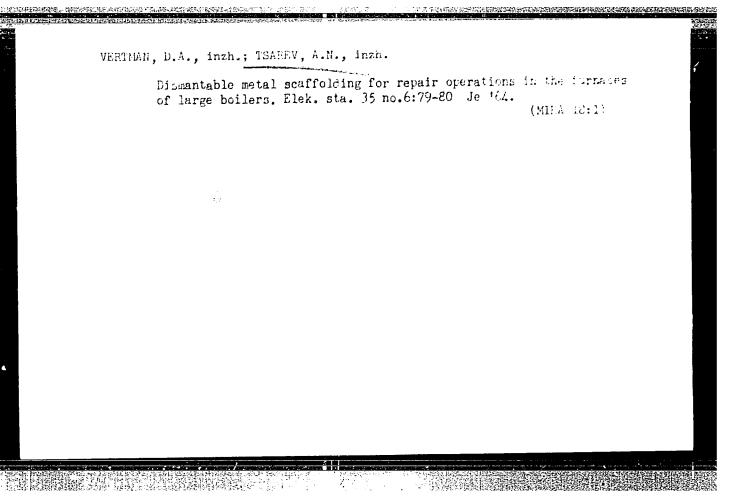
1. Nauchno-issledovatel'skiy sektor Vsesoyuznogo proyektnoizyskatel'skogo i nauchno-issledovatel'skogo instituta "Gidroproyekt" im. S.Ya.Zhuk. (Volga Hydroelectric Power Station--Dams)

APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001756920004-7"

TSAREV, A.I., inzh.; FEL'DMAN, A.I., inzh.; GROBOV, P.A., inzh.

Measuring thermal stresses on the surface layer of reinforced concrete structures. Gidr.stroi. 34 no.11:27-30 N '63.(MIRA 17:3)

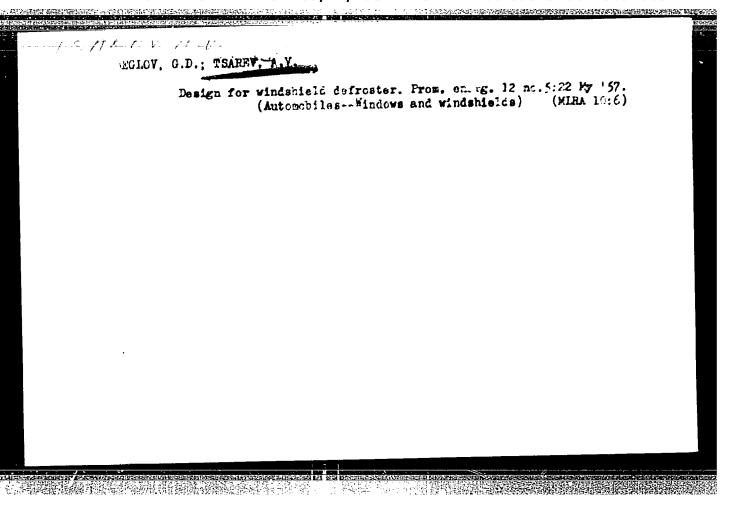
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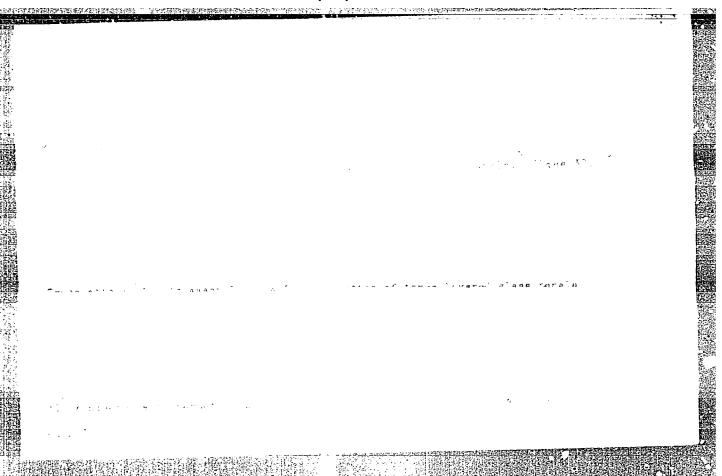


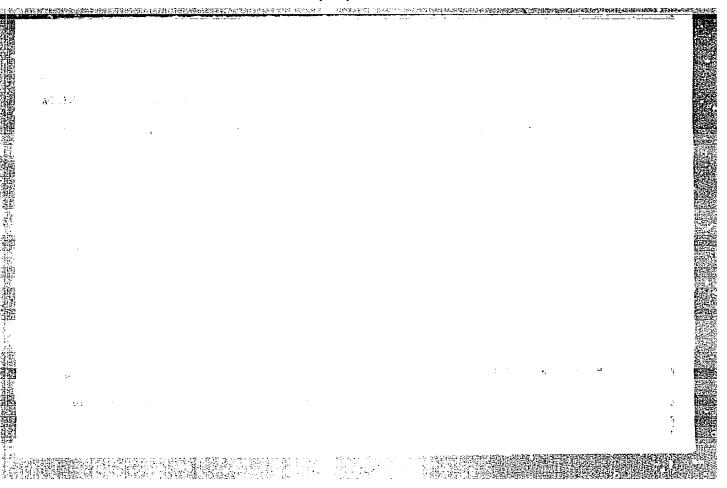
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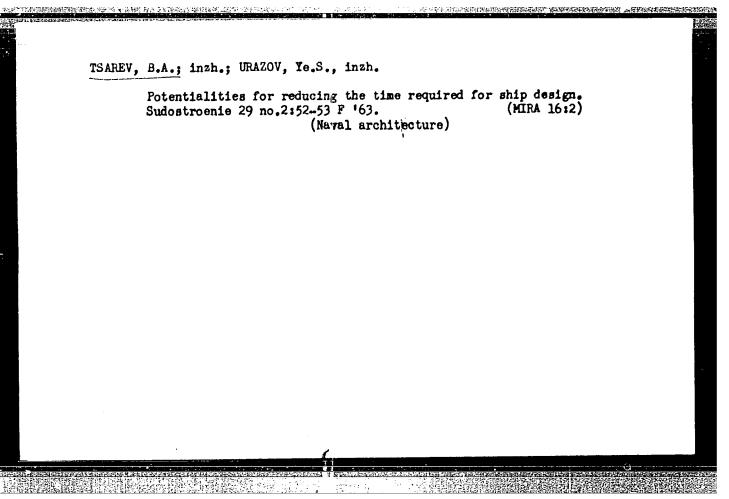
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47 no.11:77-80 N '(3).

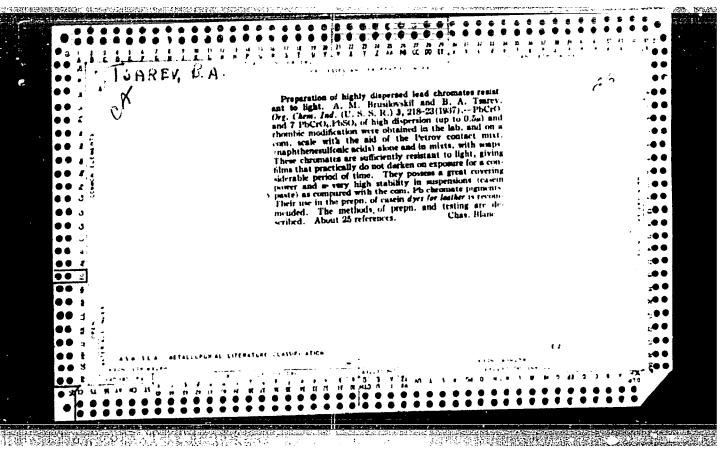
(MIRA 16:11)

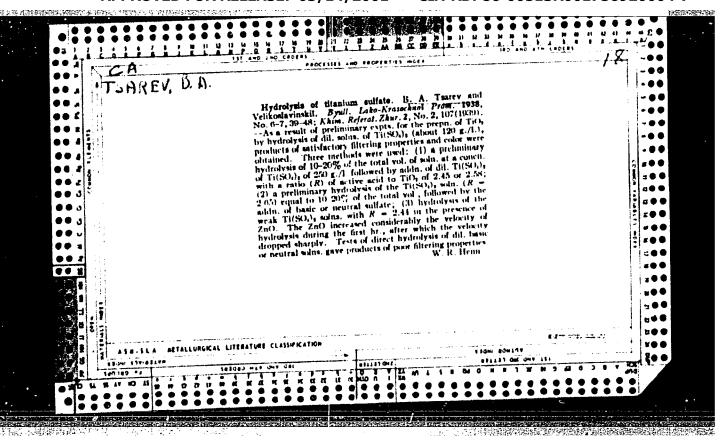


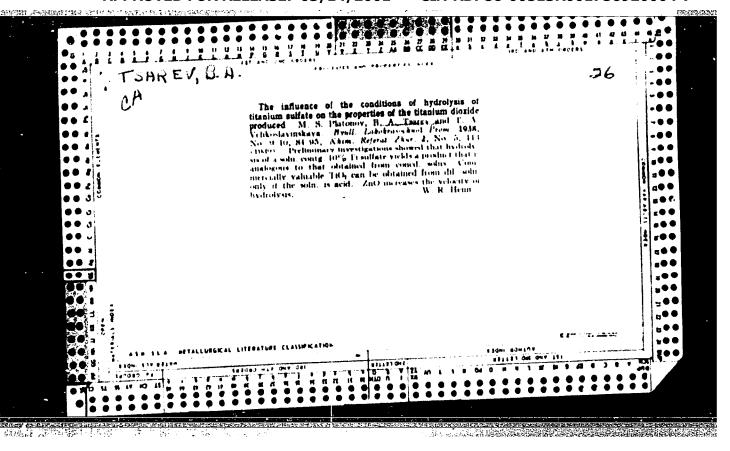


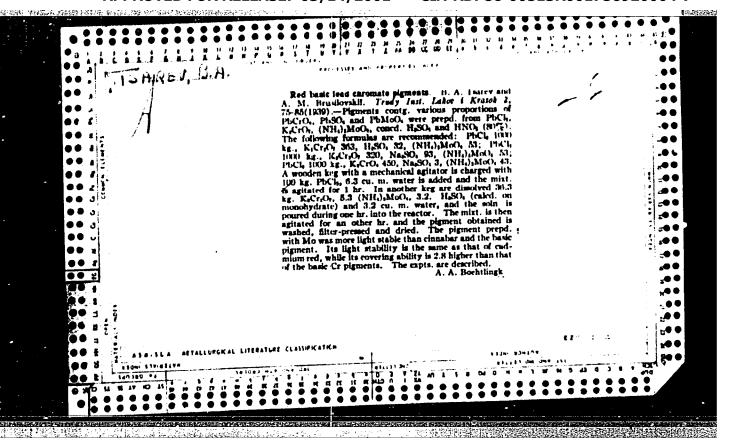


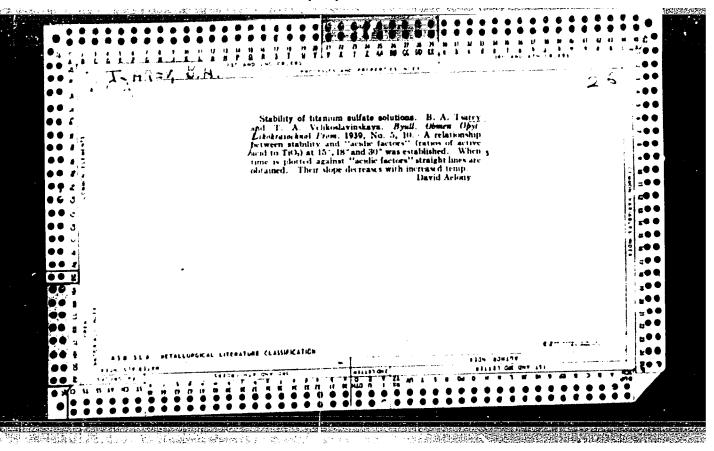


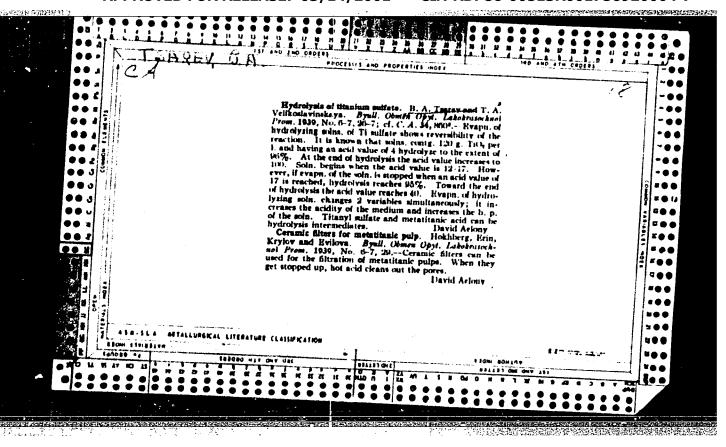


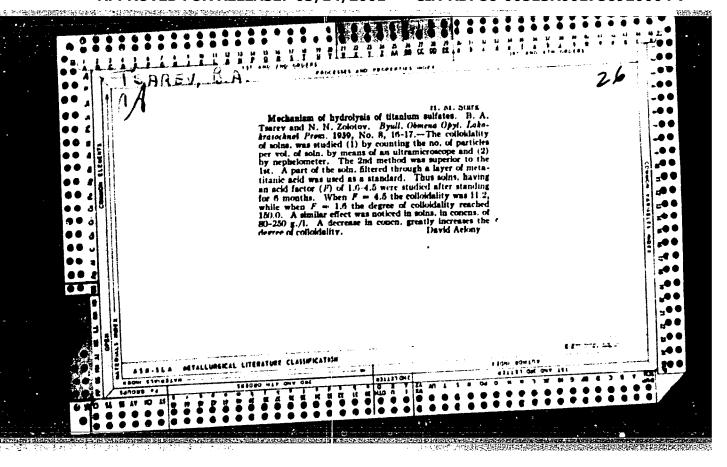










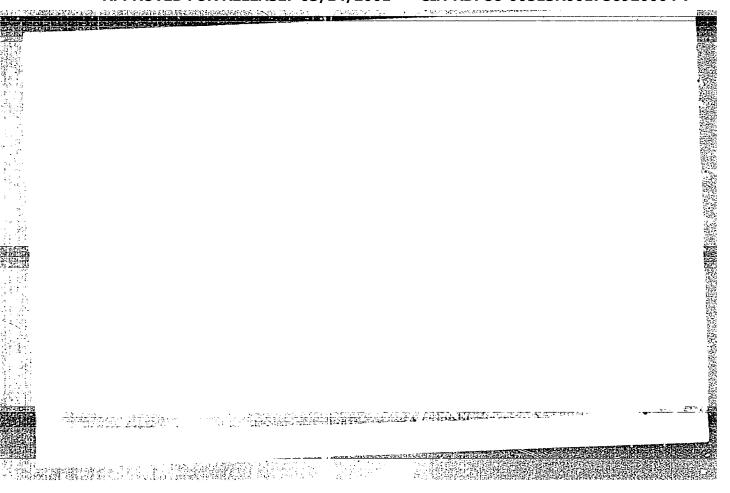


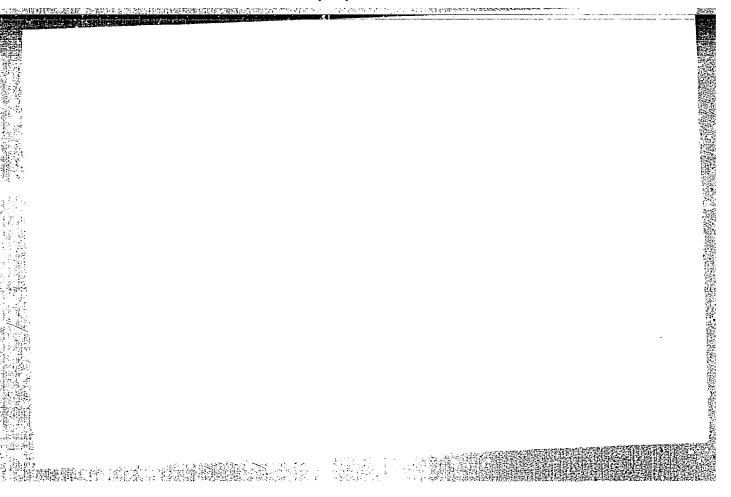
Dissertation: -- "Oxidation of Color Developer by Atmospheric Oxygen and Silver Bro-Dissertation: -- "Oxidation of Color Developer by Atmospheric Oxygen and Silver Bro-Dissertation: -- "Oxidation of Cinema Engineers, Leningrad 1953 wide: " Cand Chem Sci, Leningrad Inst of Cinema Engineers, Leningrad 1953 wide: " W-30928

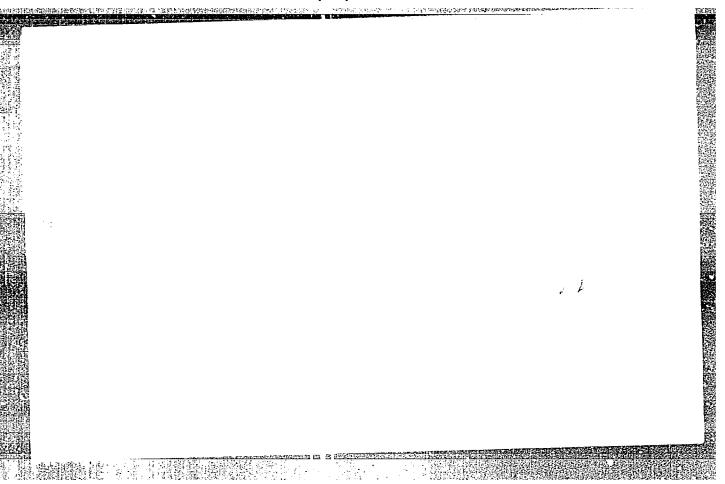
SO: Referativnyy Zhurnal, No. 5, Dec 1953, Moscow, AN USSR (EXCEPT)

APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001756920004-7"

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TSAREV, B.A.; KOL'TSOV, V.V.

Colorimetric method of analysing diethyl-paraphenylenediamine in a color developer. Trudy LIKI no.3:207-212 '55. (MLRA 9:8)

1. Kafedra tekhnologii proisvodstva kinofotomaterialov.
(Color photography--Developing and developers)
(Phenylenediamine)

APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001756920004-7"

TSAREY, R.A.; GANNEMAN, V.V.; MARTYSH, G.G.; YAKOVLEVA, T.P.

Use of polyvinyl alcohol in photographic emulsions. Trudy LIKI no. 5:159-164 '59.

1. Kafedra tekhnologii proizvodstva kinofotomaterialov Leningradskogo instituta kinoinzhenerov.

(Photographic emulsions) (Vinyl alcohol)

APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001756920004-7"

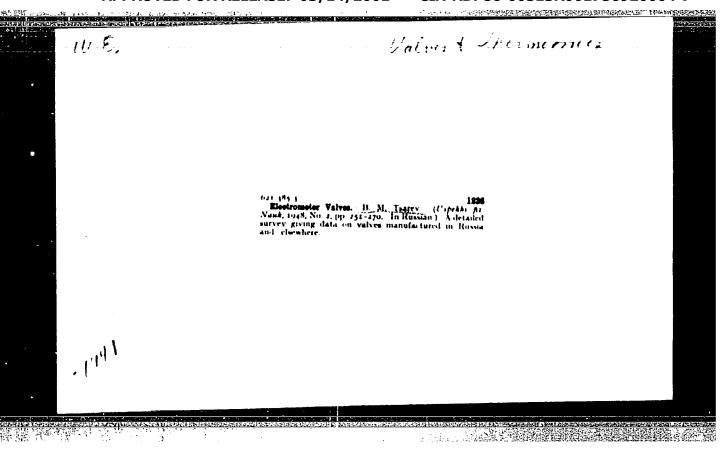
TSAREY, B.A.; BOGDANOV, L.M.; MARTYSH, G.G.; LIPCHANSKAYA, V.I.

Possibility of partial substituting of synthetic polymers for gelatin in photographic emulsions. Tekh.kino i telev. 4 no.8:8-11 Ag '60. (MIRA 13:8)

1. Leningradskiy institut kinoinshenerov. (Photographic emulsions)

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	USSR/Electricity Electrometers	
	"Electrometric Tubes," B. M. Ta	arev, 19½ pp
	Neuk" Vol XXXV,	No 2
	Treats subject under: (1) gri	d currence; thods of reducing cometric tubes; (3)
	them; (2) management tu	Des and mass-prc-
	increasing it. Discusses use increasing it. Discusses use duced tubes in electrometric photographs, tables, and diag	rams.
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TSAREV. Boris Mikhaylovich; YALTUNOVSKAYA, M.V., redaktor; AKHLAMOV,

[Contact differential potentials and their effect on the operation of vacuum-tube devices] Kontaktnaia raznost, potentsialov operation of vacuum-tube devices] Kontaktnaia raznost, potentsialov i ee vliianie na rabotu elektrovakuumaykh priborov. Izd-vo 2-oe perer. i dop. Moskva, Gos.izd-vo tekhniko-teoret. lit-ry, 1955.

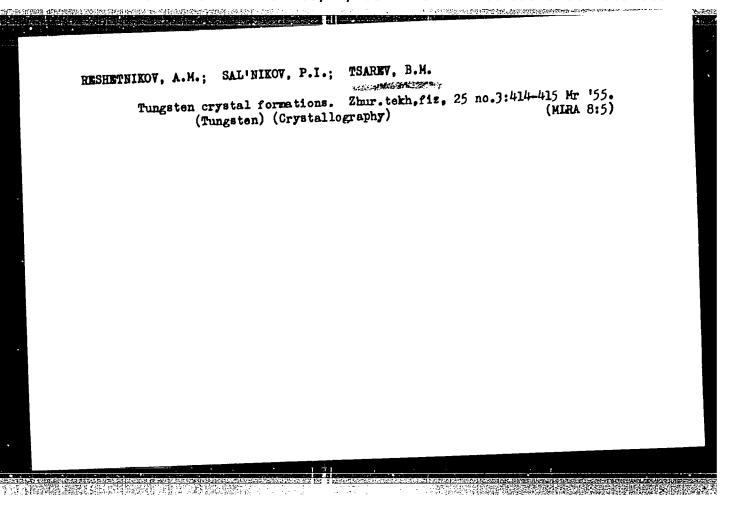
(MLRA 8:12)

(Electron tubes)

DERECHRUNG UND KONSTRUKTION VON ELEKTROMENROHREN.
BERLIN, VEB VERLIG TE HRIK, 1995.
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"MALAGUREMENT AND I NSTRUCTION OF LEGITION TUD S."

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SUPPE, G.B., TSAREV, B.M., prof., otvetstvennyy red.

[Electron emission from metallic crystals] Elektronnaia emissiis metallicheskikh kristallov. Tashkent, Izd-vo SAUJ, 1957. 1ll p. metallicheskikh kristallov. Trudy Sredneaziatskogo gosuderstvennogo (Tashkent. Universitet. Trudy Sredneaziatskogo gosuderstvennogo universiteta, no.115. Fiziko-matematicheskie nauki, no.17).

(Electron emission) (Metals) (MIRA 11:10)

TSAREV, B.M., prof.red.; VISKOVA, M.V., red.; IOVIEVA, H.A., tekhn, red.

Oxide-costed cathodes; a collection of papers delivered at the International Congress commemorating the fiftieth anniversary of the invention of the oxide-coated cathode] Oksidnyi katod; sbornik trudov Mezhdunarodnogo kongressa, posviashchennogo piatidesiatitrudov Mezhdunarodnogo kongressa, posviashchennogo piatidesiatiletiiu otkrytiia oksidnogo katoda. Pod red. B.M.TSareva. Moskva. Izd-vo inostr. lit-ry, 1957. 480 p. (MIRA 11:3)

1. Congres international du conquantenaire de la cathode a oxydes. Paris, 1955. (Cathodes) (Electron tubes)

SAREV, B.M.

109-6-1/17

AUTHOR TITLE

PERIODICAL

ABSTRACT

The Ways of Development of Thermoionic Cathodes

(Puti razvitiya termoeletronnykh katodov. Russian) Radiotekhnika i Elektronika, 1957, Vol 2, Nr 6, pp 675 - 687(U.S.S.R.)

In its essential parts the present work deals with the modern development of thermoionic cathodes for ultra-high-frequency electronics. The demands made on the occasion of the production of lamps with a net-control for broad band amplifiers are shortly discussed. The first mentioned of these demands is the limitation exercized by the specific power dispersed by the electronic collector. The author shows that the cathode-types present do by far not meet the demands in relation to the emission-current density. The present classification of thermoionic cathodes as well as the degree of security of their meeting the demands on the occasion of their work in different electro-vacuum apparatus. Further development must be in accordance with the demands at the expense of the high emission-current density as well as of the operation temperatures of the cathodes as this is dictated by the necessity of decreasing the level of static and increasing life. One of the directions for a possible elaboration of the electron-flow with high density can, on the one hand, be the investigation and elaboration of hollow cathodes and, on the other hand, the formation of ca-

Card 1/2

109-6-1/17

The Ways of Development of Thermoionic Cathodes

thode-accumulations with a focusing of the electronic flow by means of an optic fixed to the cathode. Three possible ways for the increase of the emission-capability of the cathodes are shown and investigated. Two directions for the development of the metal-capillary cathodes are described, in one of which the development of a number of complicated cathodes takes already place. (With 6 illustrations and 4 Slavic references).

ASSOCIATION PRESENTED BY SUBMITTED AVAILABLE

Not given

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CIA-RDP86-00513R001756920004-7" **APPROVED FOR RELEASE: 03/14/2001**

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sov/81-60-2-4306

Referativnyy zhurnal. Khimiya, 1960, Nr 2, p 103 (USSR) Translation from:

AUTHORS:

Kudintseva, G.A., Tsarev, B.M., Epel'baum, V.A.

TITLE:

The Borides of the Transition Metals and Their Electron-Emission

Properties

PERIODICAL:

V sb.: Bor. Tr. Konferentsii po khimii bora i yego soyedineniy. Moscow,

Goskhimizdat, 1958, pp 106 - 111

ABSTRACT:

A method was described for obtaining the diporides of $\underline{T1}$, \underline{Zr} , \underline{V} , \underline{Cr} , Mn and other transition metals by means of combined reduction by carbon of the mixtures of oxides of the corresponding metal and boron; the method permits the production of borides in large quantities from easily available raw material. In the series of the diborides of Ti, V, Cr, and Mn the greatest emission, comparable to the emission of Ce hexaboride, has Cr diboride which can be used as material for thermocathodes. The diborides have a coefficient of secondary emission which is less than unity and can be used therefore as anti-dynatronic coatings.

Authors' summary

Card 1/1

9.3120 52300 68953 sov/81-60-2-4305

Referativnyy zhurnal. Khimiya, 1960, Nr 2, p 103 (USSR) Translation from:

AUTHORS:

Kudintseva, G.A., Epel'baum, V.A., Tsarev, B.M.

TITLE:

The Synthesis of Hexaborides of Some Rare Earth Metals and Their

Electron-Emission Properties

PERIODICAL:

V sb.: Bor. Tr. Konferentsii po khimii bora i yego soyedineniy. Moscow,

Goskhimizdat, 1958, pp 112 - 119

ABSTRACT:

The hexaborides of La, Cr, Pr, Nd and cerium-mixmetal can be obtained by the combined reduction of a mixture of the oxide of the corresponding rare earth element and boron by carbon by means of thermal treatment under

a certain condition (by stages). The emission constants of La and Ce hexaborides coincide well with the literature data; the constants of cerium-mixmetal boride deviate from them, which can be explained by the difference in the composition of the cerium-mixmetal samples. The coefficients of the secondary emission of all hexaborides are less than unity, i.e., these hexaborides can be used for anti-dynatronic coatings, especially

the hexaborides of Nd and Pr, which have also a low thermo-ionic emission

Card 1/2

68953 sov/81-60-2-4305

The Synthesis of Hexaborides of Some Rare Earth Metals and Their Electron-Emission Properties

activity. La hexaboride, due to the high thermo-ionic emission, can be used for the manufacture of cathodes for powerful superhigh-frequency devices. The low coefficient of secondary emission makes it impossible, however, to employ it for magnetronic cathodes. The radiation coefficients of all hexaborides are within the range 0.65 - 0.70. The hexaborides react with the underlaying material, forming Ta boride.

From the authors' summary

Card 2/2

154886, B.M

Nikonov, B.P. and Tsarev, B.M. AUTHORS:

109-3-2/23

TITLE:

Investigation of Nickel Alloys for Oxide Cathode Cores (Issledovaniye nikelevykh splavov dlya kernov oksidnykh

katodov)

PERIODICAL:

Radiotekhnika i Elektronika, 1958, Vol. III, No. 3 pp. 313 - 321 (USSR).

An attempt is made to find such reducing agents which, when added to the core of an oxide cathode, will readily evap-ABSTRACT: activation temperaorate from the cathode nickel at the tures and will produce compounds (at the boundary between the oxide layer and the core) having conductivity approximately equal to that of the oxide layer. An estimate of the reducing properties of various elements with respect to the oxides of rare metals can be done on the basis of the free energy of the chemical reaction involved. Such estimates were made by A. White (Ref.4) for certain oxide cathode reactions; similar calculations were made by the authors for a large number of the reactions (Ref.5). The resulting data are indicated in Table 2, which shows the value of the free energy, the equilibrium constants and the vapour pressure of barium during the thermal dissociation and reduction of barium/by Ni, W, Si, Ti, Al, Mg, Th, Ca and Sr. The table shows that very low berim vapour

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109-3-2 '23

Investigation of Nickel Alloys for Oxide Cathode Cores

pressures are obtained during the thermal dissociation so that these pressures can produce the concentrations of free metal in an oxide layer of the order of 10-14 or 10-13 at the normal operating temperatures of the cathode. This quantity of the free metal is much lower than that necessary for the activation. Further data on the reaction between oxide layer and the core are shown in Fig.8; these were taken from a work by A. Eisenstein (Ref.8). From the above, it is concluded that from amongst the various metals, only Ba, Sr and Ca have the necessary evaporation rate, satisfactory reducing properties and low inter-face resistance. Some experimental measurements were also carried out to investigate the problem more satisfactorily. The first series of experiments were done on thermionic diodes having flat cathodes and Kovar anodes. temperatures of the cathode were measured in each tube by means of a thermocouple. The cathodes had a diameter of 5 and 3.6 mm, were made of nickel tape, and were coated with double carbonate. The thickness of the coating was 100 to 220 μ . Two types of the experimental tubes are shown in Figs. 2 and 3. The characteristics of the tubes were measured by means of pulses having Card2/4 μsec. duration and 100 p.p.s. repetition rate. The results

109-3-2/23

Investigation of Nickel Alloys for Oxide Cathode Cores

are reported in Tables 3, 4, 5 and 6 and in Figs. 4 to 8. From Tables 4 and 5, it follows that Ca and Sr activate the cathode very satisfactorily, while W is less satisfactory; practically no activation can be obtained on a pure nickel. Figs. 6 show the change of the emission current as a function of time for nickel-cathodes with the following admixtures: 1) Ca; 2) Si; 3) W; 4) Mg and 5) pure electrolytic Ni. From these, it follows that the tubes fitted with a Ni-cA cathode core give the highest stable currents, while the tubes fitted with other types of cores have comparatively low emission currents which can be attributed to either their poor activation properties or high inter-face resistance, or both. Figs. 7 and 8 show the mutual conductance of two commercial tubes which were fitted on the following types of cathodes: a) Ni-Ca; b) Ni-W, and o) Ni-Si. The above investigation showed that the inclusion into the Ni core of an oxide cathode of such admixtures as Ca and Sr is highly desirable, since it leads to an improvement in the cathode characteristics; the cathodes can easily be activated, have a comparatively low inter-face resistance and give a stable emission.
There are 8 figures, 6 tables and 11 references, 8 of which Card3/4 are English and 3 Russian.

"APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001756920004-7

Investigation of Nickel Alloys for Oxide Cathode Cores

SUBMITTED: May 31, 1957

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Card 4/4

109-3-16/23

AUTHORS: TITIE:

TSAREV, B.M. Kudintseva, G.A. and Tsarev, B.M.

Emission Characteristics of the Hexaborides of Certain Rare Earth Metals (Emissionnyye svoystva geksaboridov

nekotorykh redkozemel'nykh metallov)

Radiotekhnika i Elektronika, 1958, Vol.III, No.3, pp. 428 - 429 (USSR). PERIODICAL:

Works functions ϕ and emission constants A of the following compounds were investigated: GdB6, DyB6, ErB6, HoB6 ABSTRACT: The results are shown in the table on p.428, together with similar constants for various other hexaborides. YbB6 and LuB6. The work function of various hexaborides as a function of the atomic number of the metallic elements is shown in the figure on p.429. It is found that the thermionic emission of GdB₆ is much higher than that of LaB6 and that GdB6 can be used as the material for efficient cathodes. The only obstacle in the realisation of such cathodes is a comparative "rarity" of gadolinium, but it is to be expected that this will be overgadolinium, but it is to be expected that this will be overgadolinium, but it is to be expected that this will be overgadolinium, but it is to be expected that this will be overgadolinium, but it is to be expected that this will be overgadolinium, but it is to be expected that this will be overgadolinium, but it is to be expected that this will be overgadolinium, but it is to be expected that this will be overgadolinium, but it is to be expected that this will be overgadolinium, but it is to be expected that this will be overgadolinium, but it is to be expected that this will be overgadolinium, but it is to be expected that this will be overgadolinium. There are a supplied that the supplied t

November 14, 1957 SUBMITTED: Library of Congress AVAILABLE:

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SOV/109-3-8-5/18

Kapitsa, M.I., Mel'nikov, A.I., Morozov, A.V., Popov, B. H., Sobolevskaya, R.B., Tsarev, B.M. and Shullman, A.R. AUTHORS:

Thermionic Properties of Barium Tungstate (Termo-TITIE:

elektronnyye svoystva vol'framata bariya)

Račioteklnika i Elektronika, 1958, Vol 3, Nr 8, PERIODICAL:

pp 1010 - 1016 (USSR)

The work described was concerned with the investigation of the tharmionic emission of barium tungstate and Ea2CaWO6. Threstigation was undertaken since it was ABSTRACT:

thought that the resulting data might be useful in explaining the operation of the pressed cathodes and other cathodes which contain barium tungstate. The investigations were carried out on directly heated on thodes which were based on tungsten and molybdenum cores. The measurements were made on special experimental diodes, fitted with protective anodes. The cathode temperature was determined by measuring the change in the resistance of the core. All the measurements were done under static conditions. The continuof BazWos and BazCaWos

were effected by two methods:: a) a filament of the

Cord1/4

SOV/109-3-8-5/18

Thermionic Properties of Barium Tungstate

core metal was passed through a drop of the coating substance mixed with a binder; b) cataphoretic coating was used. In the first case, coarse-grain coatings were obtained, while the second method permitted obtaining the particles having a diameter of about 1 - 5 \mu . The cathodes were de-gassed by heating up to 1 250 K for the duration of 1 - 2 hours without taking any current.

This processing resulted also in a partial activation of the cathodes. Further activation of the cathodes. Further activation of the cathodes (by heating and taking the current) was then carried but. During the preliminary activation, it was carried but. During the preliminary activation, it was found that the work function (as measured from the Richfound that the work function dropped to 1.2 - 0.5 eV. final activation, the work function dropped to 1.2 - 0.5 eV. The characteristics of a barium-tungstate cathode after final activation are shown in Figure 2. The emission current and the work function of the same cathode for current and the work function of the same cathode for current and the work function of the same cathode for current activating temperatures are given in Table 1. On various activating temperatures are given in Table 1. On the other hand, it was found that the cathodes of Ba2CaWO the other hand, it was found that the cathodes of the order

Card2/4

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Thermionic Properties of Barium Tungstate

SOV/109-3-8-5/18

μΑ/cm², as can be seen from Table 2. By comparing the results of Table 2 with those for BayWO₆ (given in Table 3),

it is seen that the emission of the latter is about 100 times higher than that of the former. It was found that the curve:

 $1e^{\frac{I}{T^2}} = f\left(\frac{1}{T}\right)$

for the cathode of barium tungstate consists of three regions (Figure 4). At low temperatures (below 900 K), the curve has the highest slope; the work function in this region is equal to 1.3 eV. In the regions of temperatures from 900 - 1 250 K, the work function has a value of shout 0.6 - 0.7 eV. Finally, at temperatures above 1 250 K, about 0.6 - 0.7 eV. Finally, at temperature and the the current decreases as a function of temperature and the slope of the curve cannot be regarded as representing the work function.

Card3/4

"APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001756920004-7

Thermionic Properties of Barium Tungstate

SOV/109-3-8-5/18

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There are 5 figures, 5 tables and 4 references, 3 of which are Soviet and 1 English.

SUBMITTED: January 29, 1958

Card 4/4

1. Barium tungstates--Properties 2. Thermionic emission--Analysis

3. Cathodes--Performance

A POPUL STOCK STRUCK STRUCK STOCK SERVICE STRUCK ST

mikonov, B.P., Tarash, 1.L. and Tsarev, B.M. AUTHORS:

Influence of the Temperature and Core Material on the TITLE:

Life of an Oxide Cathode (Vliyaniye temperatury i materiala kerna na dolgovechnost' oksidnogo katoda)

Radiotekhnika i Elektronika, 1958, Vol 3, Hr 8, PERIODICAL:

pp 1043 - 1045 (USSR)

The investigations described were carried out on tubes, ABSTRACT:

type 62hlP, the cathode temperatures being 780, 820 and 850°C. The cores of the tube cathodes were either of pure, electrolytic nickel, nickel with admixture of strontium or nickel with tungsten. The chamical composition of these core materials is shown in the table on p 1043. The cathodes of the tubes were coated with the triple carbonate of the standard composition and the tubes were mounted, pumped and activated by the usual, standard technique. The experimental results are shown in Figures 1, 2, 3 and 4. The curves of Figure 1 show the emission current as a function of time for the three cathode temperatures. The curves of Figure 2 represent the slope of the tubes as a function of time for the

above three temperatures. Figure 3 shows the current of

card 1/2

SOV/109-3-8-10/18
Influence of the Temperature and Core Material on the Life of an Oxide Cathode

the tubes as a function of time for the three core materials, while rigure 4 shows the current for various temperatures for the nickel-strontium cathode. From the investigation, it is concluded that long life in the tubes can be secured by running the cathodes at a comparatively low temperature (750 - 780°C). It was also found that the amount of an activator in the cathode core should be small but it must be sufficient to permit an adequate activation of the cathode. There are 4 figures and 7 references, 6 of which are Soviet and 1 English.

SUBMITTED:

January 29, 1958

Card 2/2

Oxide cathodes--Life expectancy
 Oxide cathodes--Materials
 Oxide cathodes--Temperature factors
 Oxide cathodes--Test

results

SOV/126-6-2-11/34

Kudintseva, G. A., Polyahova, M. D., Samsonov, G. V. AUTHORS:

and Tsarev, B. M.

Preparation and Certain Properties of Yttrium Hexaborida TITLE:

(Prigotovleniye i nekotoryye svoystva geksaborida

ittriya)

PERIODICAL: Fizika Metallov i Metallovedeniye, 1956 Vol 6, Re 2

pp 272-275 (USSR)

ABSTRACT: The reaction $Y_2O_3 + 3B_4C = 2YB_6 + 3CO$ was also ted over

the range $880-1900^{\circ}\text{C}$; the reaction occurs in one stage at 970°C . $\triangle\text{H}_{298}^{\circ}$ is about 24 kcal/mol for Yh_{6} :

analysis gives 42.11% B (theory 42.19%). Yield at 1800-1900 C 92-93% (YB6 partially dissociates at this

temperature). The powder pattern gives the lattice constant as 4.128 R. Table 1 gives the W, hkl and intensity values. The pyknometer density is 3.64 ± 0.04 g/cm (X-ray density 3.633). Hot-pressed specimens have a microhardness of 3264 ± 21 kg/mm² specimens have a microhardness of 3264 ± 21 kg/mm² card 1/2 (50 g load); YBc reacts with graphite at 2100-2150 c

SOV/126-6-2-11/34

Preparation and Certain Properties of Yttrium Hexaboride

and fuses at about 2300°C. The thermionic emission (Richardson) curve is compared with those for LaB6 and CeB6; the relevant constants are work functions 2.22 ± 0.05 eV and A = 15 amps/cm² deg². The thermal emission coefficient at 1500°C is 0.7 (for 655 mµ). The results are discussed in relation to the electronic structure of the compound. There are 2 figures, 3 tables and 11 references, 5 of which are Soviet, 5 English, 1 German.

ASSOCIATION: Institut metallokeramiki i spetsialnykh splavov AN Ukr SSR (Institute of Metal Ceramics and Special Alloys, Ac.Sc. Ukr. SSR)

SUBMITTED: December 20, 1956

Card 2/2 1. Yttrium borides--Preparation 2. Yttrium borides--Properties

TSAREV, B.M., inzh.

New tool for cutting stone test pieces to be used in laboratory tests. Stroi.mat. 5 no.12:35-36 D '59. (MIRA 13:3)

(Stonecutting -- Equipment and supplies)

APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001756920004-7"

AUTHORS: Bondarenko, B.V. and Tearey, B.M. Sov/109-4-6-23/27

TITLE: Thermo-electronic Characteristics of the Metal Oxides of the III and IV Groups (Termoelektronnyye svoystva

okislov metallov III i IV grupp)

PERIODICAL: Radiotekhnika i elektronika, 1959, Vol 4, Nr 6,

pp 1059 - 1060 (USSR)

ABSTRACT: The metal oxides Sc_20_3 , Y_20_3 , La_20_3 , Tio_2 , Zro_2 and Hfo_2

have comparatively high melting points and are therefore of interest as the materials for the cathodes operating at high temperatures. ThO₂ is an oxide of the same type.

The investigation described aimed at determining the emissivity of the above exides. The cathods prepared from $\rm La_2O_3$ and $\rm TiO_2$ were activated at a temperature of

2 200 °K, while the remaining exides were activated at 2 600 °K. The current-temperature curves for all the materials are indicated in the figure on p 1059. It is seen that the Richardon curves for all the exides except TiO₂ consist of two linear portions. This is thought to

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SOV/109-4-6-23/27

Thermo-electronic Characteristics of the Metal Oxides of the III and IV Groups

be due to the dependence of the electrochemical potential of the semiconductor cathodes on the equilibrium concentration of donors within the investigated temperature interval (B.V. Bondarenko - Ref 10). The table on p 1060 shows the values of ϕ_0 and A obtained from the Richardson curves. The work function of the cathodes ϕ_T is also shown in the table. From the investigation, it is concluded that apart from ThO_2 and Y_2O_3, the hafnium oxide HfO_2 is the most promising material. This is principally due to the fact that HfO_2 forms very stable layers which are strobgly attached to the tungsten core of the cathode.

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There are 1 figure, 1 table and 10 references, 4 of which are English, 1 French and 5 Soviet: 1 Soviet reference is translated from French and 1 from English.

SUBMITTED: January 5, 1959

Card 3/3

APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001756920004-7"

GAPANOV, Viktor Ivanovich; IONOV, N.I., prof., retsonzent; NILENDER, R.A., prof., retsenzent; TSAREV, B.M., prof., retsenzent; BRAGINSKIY, V.B., red.; MURASHOVA, H.Ya., tekhn.red.

[Electronics] Elektronika. Moskva, Gos.izd-vo fiziko-matem.

lit-ry. Pt.l. [Physical principles] Fizicheskie osnovy. 1960.

(MIRA 14:3)

(Electronics)

APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001756920004-7"

25971 s/539/60/000/031/004/014 E071/E135

Card 1/ 5

Tsarev, B.M.

AUTHOR: TITLE

The role of the D.I. Mendeleyev Law in modern

cathode electronics

PERIODICAL: Moscow. Khimiko-tekhnologicheskiy institut. Trudy, No.31, 1960. Issledovaniya v oblasti khimii i tekhnologii elektrovakuumnykh materialov. pp.29-35.

The importance of D.I. Mendeleyev's discovery of the periodical system of elements, which became the key to the solution of various problems in many branches of science and technology, including modern electronics, is discussed. It is considered that as yet insufficient attention is paid to the systematisation of experimental results obtained during various investigations in order to discover regularities which, in the light of the periodic law, would be of considerable help in the search for new materials. The latter is particularly true in the field of thermoelectronic emission, where the continuously increasing requirements of modern thermocathodes demand new materials. Binary compounds of oxides of high melting elements

25971 s/539/60/000/031/004/014 E071/E135

The role of the D.I. Mendeleyev

with oxides of alkali metals are quoted as an example. relationship between the electron work function and the atomic number of elements has been recently discussed. However, as the surface phenomena were compared with the properties of elements which are obviously volume properties (dansity and compression coefficient) the correlation was poor. The relationships between the coefficient of secondary electron emission (δ_{max}) and atomic number, according to data presented by N.G. Nakhodkin in 1955 at the All-Union Conference on cathode electronics (Ref. 4: Kiyev, Vsesoyuznoye soveshchaniye po katodnoy elektronike, 1955, Izv. AN SSSR, Fiz., V.20, 1006 (1956)) and the dependence of the work function of hexaborides of rare earth elements on the atomic number (published by G.A. Kudintseva and the present author in Ref.5: Radiotekhnika i elektronika, Vol.3, No.3, 428 (1958)) are better and more pronounced. The above relationships and a few small annotations are all that have been quoted in Russian and foreign literature. The quoted Soviet information is summarised in plots Figs. 5 and 6. Therefore, the author stresses the necessity of carrying out investigations of relationships between

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E071/E135

emissive and other properties of elements and their compounds and the periodic system.

There are 6 figures and 6 references: 4 Soviet and 2 non-Soviet.

The English language reference reads as follows:

The role of the D.I. Mendeleyev

Ref. 2: J.F. Chittum, J. Phys. Chem., V.38, 79 (1934).

Caption to Fig.5 Dependence of σ_{max} on the specific atomic number of the element, σ_{max} versus atomic number

Card 3/5

9,3120 26.1640

25972 s/539/60/000/031/005/014 E071/E135

AUTHORS:

Kovtunenko, P.V., Kondakov, B.V., and Tsarev, B.M.

TITLE:

On the chemical methods of determination of free

alkali earth elements in effective thermocathodes made

on the basis of compounds of these metals

Card 1/5

PERIODICAL: Moscow. Khimiko-tekhnologicheskiy institut. Trudy, No.31, 1960. Issledovaniya v oblasti khimii i

tekhnologii elektrovakuumnykh materialov. pp. 36-45

TEXT: Despite the considerable number of experimental works, the problem of concentration of the excess of an alkali earth metal in an oxide cathode, particularly its dependence on various factors and its influence on the operation of the cathode, is not sufficiently clear. The appearance of a number of new types of cathode, the nature of which cannot be established without experimental investigation of the concentration and evaporation of excessive alkali earth elements, made the problem particularly important. For the above reason, the present authors surveyed papers published on this subject. As the concentration of the

On the chemical methods of

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excess of the alkali earth metal in an oxide cathode is of the order of 0.002-0.5 mole % the usual chemical methods are inapplicable and the determination is based either on the determination of the oxygen evolved (if the formation of the excess of the metal from its oxide is accompanied by the evolution of oxygen) or on the consumption of specially introduced gas, capable of combining with the metal. The following methods are a) after the usual treatment of the vacuum system, the cathode is activated by drawing the emission current. The oxygen evolved is pumped into a preliminarily evacuated volume and its amount measured with a compression manometer, after which some hydrogen is introduced and reacted with the oxygen. water formed is frozen out and the measurement of the pressure is repeated. The difference in pressure is ascribed to oxygen. b) Based on the amount of oxygen necessary to transfer the free c) Based on a treatment of the activated metal into its oxides. cathode with water (Me + H_2O = MeO + H_2 or Me + $2H_2O$ = Me(OH)₂ + + H2) and measuring the amount of hydrogen evolved. The special feature of this mathod, proposed in 1932 by T.P. Bardennikova, is Card 2/5

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the active reaction with water not only with the excess metal but also with oxides of alkali earth elements from which the cathode is made (BaO + H_2O = Ba(OH₂). This destroys the cathode, but the total excess of the free metal, i.e. not only present on the surface but also in the lattice of the oxide, is measured. the reaction of the metal with nitrogen at 200-600 °C forming nitride (Ba3N2). On subsequent treatment of the cathode with water. the nitride formed is decomposed with the evolution of ammonia which is determined colorimetrically. the hot metal and carbon dioxide (Ba + CO2 = BaO + CO). From the point of view of sensitivity, all methods with the exception of d) are approximately similar and their accuracy depends on the accuracy of the determination of the pressure of the gaseous product. However, the method c) is the most accurate. With the authors' [not described] it is possible to measure quantities of 3-5 \times 10⁻⁹ g of barium. The necessary precautions to obtain good results with this method are described in some detail (degassing of the glass and water, prevention of penetration of substances capable of reacting with water into the analytical system, e.g. material of Card 3/5

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On the chemical methods of

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the base of the electrode and of the preheater). On the basis of the reaction with water, the authors developed a method of separate determination of barium present in the cathode and barium evaporated from it. A number of glass caps with a piece of iron hermetically sealed in each (to enable their transfer by a magnet) are placed in the vacuo system. At a given time such a cap is placed over the cathode and barium evaporating during the heat treatment condenses on the cap. Subsequently at a given time, the cap is transferred by a magnet into the analytical system for the water treatment and a new cap is put over the cathode. This method can be used for studies of the velocity of evaporation of alkali earth elements from any cathodes from which these metals evaporate. A simultaneous application of this type of analysis with the spectral analysis enables the determination of the rate of evaporation not only of the alkali earth metals but also of their exides. The method is sufficiently reliable for the determination of the "equilibrium" concentration of alkali earth metals which is established in a cathode after a given time and given operating conditions. Card 4/5

On the chemical methods of 25972
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E071/E135

A.V. Morozov and A.I. Mel'nikov are mentioned for their contribution in this field.
There are 2 tables and 19 references: 7 Soviet, 1 German and 11 English. The four most recent English language references read as follows:
Ref. 8: L.A. Wooten, G.E. Moore, W.G. Guldner,
J. Appl. Phys., V.26, 8, 937 (1955).
J. Appl. Phys., V.26, 8, 937 (1955).
Ref. 9: G.E. Moore, L.A. Wooten, J. Morrison.
J. Appl. Phys., V.26, 8, 943 (1955).
Ref. 10: G. Zibowitz. J. Am. Chem. Soc., V.75, 1501 (1953).
Ref. 17: E.S. Rittner. Phillips Res. Rep., V.8, 184, (1953).

APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001756920004-7"

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26,2531 9.3120 (1003,1137,1140) s/109/60/005/008/008/024 E140/E555

AUTHORS:

Bondarenko, B.V., Ostapchenko, Ye,P. and Tsarev, B.M.

TITLE:

Thermionic Properties of Alkali-Earth Metal Tungstates

PERIODICAL:

Radiotekhnika i elektronika, 1960, Vol 5; No.8,

pp.1246-1253

The work functions and structures of a number of compounds, listed in the three tables, were studied by means of X-rays and electron-microscopy. The objects were, firstly, to find the barium tungstate compounds with optimum stability in vacuum at working temperatures of 1400-1700 K secondly, to find those with the best emission properties, and thirdly to determine the effects of substitution of calcium and strentium for barium in the tungstates. The technology employed has been previously described (Ref. 1). It was found that these tungstates may be synthesized by sintering in air as well as in hydrogen as proviously done. The high temperature stability of Ba3WO6 was already known from the literature, a new phase Ba2WO5 is found to have the same property. A number of compounds has been studied for the first time. It was found that BayWO6 on tantalum Card 1/2

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Thermionic Properties of Alkali-Earth Metal Tungstates
has better emission properties than on tungsten. For the tantalum
base the basic tantalate is superior to tungstate. There are
3 figures; 3 tables and 3 references: 2 Soviet and 1 non-Soviet.

SUBMITTED: December 21, 1959

Card 2/2

83276

s/109/60/005/009/026/026 B140/E455

AUTHORS:

Bondarenko, B.V., Yermakov, S.V. and Tsarev, B.M.

TITLE:

Thermionic Properties of Alkali-Earth Metal

Tantalates

PERIODICAL: Radiotekhnika i elektronika, 1960, Vol.5, No.9,

pp. 1553-1555

This is a continuation of earlier work (Ref.1) in which basic barium tantalate was found to have higher emission properties than barium tungstate. A table of the 22 compounds studied is given on p.1555. It is found that basic barium tantalate has higher emissivity than basic barium tungstate but is less stable Its limiting temperature is therefore 1500 K, as There are compared with 1700 to 1800°K for the latter compound. 3 figures, 2 tables and 3 Soviet references.

SUBMITTED: April 1, 1960

Card 1/1

TSAREV, Boris Mikhaylovich; ZASLAVSKIY, L.P., red.; FRIDKIN, A.M., tekhn. red.

[Calculation and design of electron tubes] Raschet i konstruirovanie elektronnykh lamp. Izd.2., perer. i znachitel'no dop. Moskva, Gos. energ. izd-vo, 1961. 671 p. (MIRA 15:2)

APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001756920004-7"

29327 S/109/61/006/010/026/027 D201/D3**Q**2

26, 2532

Bondarenko, B.V., Yermakov, S.V., and Tsarev, B.M.

AUTHORS: TITLE:

Thermo-electric properties of barium hafnates and

perrhenates

PERIODICAL:

Radiotekhnika i elektronika, v. 6, no. 10, 1961,

1773 - 1775

TEXT: In conjunction with the results of study of thermo-electric properties of barium tantalates by B.V. Bondarenko, Ye.P. Ostapchenko, and B.M. Tsalev, (Ref. 1: Radiotekinika i elektronika, 1960, 5, 8, 1246) which were shown to be slightly better than those of barium tungstanate, the authors give the results of their determining thermo-electric properties of barium hafnates of type (BaO)_n (HfO2)_m with n: m = 2:1; 3:1; 5:1; 7:1; and of barium perrhenates (BaO)_n (Re207)_m with n: m = 1:2; 2:1; 3:1; 7:1; The study of barium hafnates and rhenates with different content of barium oxide was required to determine the influence of barium oxide on the thermoelectric properties of complex oxicard 1/3